

REMARKS

At the outset, applicants note that the undersigned attorney conducted a telephone interview with the Examiner, Mr. Liew, on December 13, 2007 wherein features of independent claims 1, 8, 11 and 16 in relation to the electron beam image information including information of average slope angle of the sidewall of the fine pattern, information of a ratio of a bottom roundness of the fine pattern and information of a ratio of top roundness of the fine pattern, which are quantified by using information of a first-order differential waveform, was discussed. More particularly, the undersigned attorney indicated that the cited art did not disclose such features as set forth in the independent claims with the features being further described in connection with figure 4 at page 8, lines 11 - 24 of the specification. Although no agreement was reached during such telephone interview, the Examiner advised that he would discuss this matter with the SPE and advise the undersigned attorney further concerning such matter. Since the undersigned attorney has not received any additional information from the Examiner, by the present amendment, the independent claims of this application have been retained without amendment and dependent claims have been amended to more clearly set forth the average slope angle, the ratio of bottom roundness and the ratio of top roundness which is quantified by using information of a first-order differential waveform. Applicants note that the total number of claims remain the same, and at least, with respect to the independent claims, and most of the dependent claims, no new issues have been raised requiring further search and/or consideration.

As to the rejection of claims 1 - 4, 8 - 10 and 16 under 35 USC 103(a) as being unpatentable over Houge et al (US Patent No. 6,651,226) in view of Hayes (US Pub. No. 2003/0108235); the rejection of claims 11 and 17 under 35 USC

103(a) as being unpatentable over Houge et al ('226) in view of Hayes ('235) and Official Notice (MPEP §2144.03); and the rejection of claims 5 - 7, 12 - 15 and 18 under 35 USC 103(a) as being unpatentable over Houge et al ('226) and Hayes ('235) further in view of Lorusso (US Patent No. 6,930,308); such rejections are traversed insofar as they are applicable to the independent and dependent claims which have not been amended, and are traversed insofar as they are applicable to the dependent claims, as amended, and reconsideration and withdrawal of the rejections are respectfully requested.

With respect to independent claims 1, 8, 11 and 16, the Examiner recognizes that "Houge does not disclose quantifying the values of the slope and roundness of the shape of the object". (emphasis added). More particularly, applicants submit that Houge does not disclose or teach obtaining electron beam image information including information of average slope angle of a sidewall of the fine pattern, information of a ratio of bottom roundness of the fine pattern, and information of a ratio of top roundness of the fine pattern, which information is quantified by using information of a first-order differential waveform. Thus, irrespective of the contentions by the Examiner, Houge does not disclose or teach the recited features of each of the independent claims of this application and therewith the dependent claims in the sense of 35 USC 103 such that all claims should be considered allowable thereover.

The Examiner recognizing the deficiencies of Houge, contends that "Hayes discloses semiconductor image information includes information of average slope angle of a sidewall of the fine pattern (see paragraph 0042, 90° slope is a border value used to determine slope of the shape is positive or negative), information of a ratio of bottom roundness of the fine pattern and information of a ratio of top

roundness of a fine pattern and information of a ratio of top roundness of the fine pattern which are quantified by using information of a first-order differential waveform (see paragraph 20, the roundness is quantified by numerical value). One skilled in the art would quantify the values of the slope and roundness of the shape of the object because the numerical value of the characteristics of the shape of the object can be saved and retrieved using these numerical values, which save storage space compared to storing entire image of shape image." (emphasis added).

Applicants submit that the Examiner has mischaracterized the disclosure of Hayes in relation to the claimed invention, and has utilized a hindsight construction attempt, which does not result in the claimed features.

Referring to paragraph [0042] of Hayes, referred to by the Examiner, this paragraph merely indicates that a problem is solved by rotating the coordinate system or by simply applying the derivative dx/dz , since either rotating the coordinate system or evaluating the differential dx/dz provides the same information. Further, it is indicated that determination of recursivness can be done by any number of methods including as examples, a determination that the angle of the slope exceeds 90° . It is not seen that paragraph [0042], referred to by the Examiner, provides a disclosure of information of average slope angle, information of a ratio of bottom roundness and information of a ratio of top roundness quantified by using information of a first-order differential waveform, as recited in each of the independent claims of this application. Further, the Examiner's reference to paragraph [0020] of Hayes merely indicates that data of metrology systems capable of outputting profiles of physical structures can be subjected to numerical analysis to quantify the profile shape, and that exemplary information added by numerical analysis of the present invention includes sidewall angle, top rounding, bottom rounding, percent linearity

and sidewall roughness. Irrespective of the contentions by the Examiner, it is not seen that paragraph [0020] provides a disclosure or teaching of the electron beam image information including information of average slope angle of the sidewall of the fine pattern, information of a ratio of bottom roundness of the fine pattern, and information of a ratio of top roundness of a fine pattern which are quantified by using information of a first-order differential waveform, as recited in each of the independent claims of this application such that irrespective of the contentions by the Examiner, applicants submit that Hayes, like Houge, fails to disclose obtaining electron beam information including of average slope angle of a sidewall of the fine pattern, information of a ratio of bottom roundness of the fine pattern and information of a ratio of top roundness of the fine pattern which are quantified by using information of a first-order differential waveform. Thus, applicants submit that Hayes does not overcome the recognized deficiencies and the proposed combination of Houge and Hayes fails to provide the recited features of each of the independent claims 1, 8, 11 and 16 of this application, such that the independent claims and therewith the dependent claims recite features not disclosed or taught by this cited art in the sense of 35 USC 103 such that all claims should be considered allowable thereover.

With respect to independent claim 11, while the Examiner takes Official Notice, such Official Notice is challenged, and the Examiner is requested to cite art in support of the Examiner's position. In any event, the taking of Official Notice does not overcome the deficiencies as pointed out above of the combination of Houge and Hayes, such that applicants submit that the features of independent claim 11, as pointed out above, patentably distinguishes over this proposed combination in the sense of 35 USC 103.

As to the features of the dependent claims, irrespective of the further combination of Houge and Hayes with Lorusso et al, applicants submit that Lorusso does not overcome the deficiencies of Houge and Hayes as applied to the independent claims as pointed out above. Thus, all claims patentably distinguish over this proposed combination of references in the sense of 35 USC 103.

Furthermore, applicants note that by the present amendment, dependent claims 5, 10, 14 and 17 have been amended to more particularly define the average slope angle, the ratio of bottom roundness and the ratio of top roundness, which features are also not disclosed or taught in the cited art. Accordingly, such claims further patentably distinguish over the cited art in the sense of 35 USC 103 and such claims should be considered together with the parent claims and found allowable therewith.

In view of the above amendments and remarks, applicants submit that all claims present in this application should now be in condition for allowance and issuance of an action of favorable nature is courteously solicited.

To the extent necessary, applicants petition for an extension of time under 37 CFR 1.136. Please charge any shortage in the fees due in connection with the filing of this paper, including extension of time fees, to the deposit account of Antonelli, Terry, Stout & Kraus, LLP, Deposit Account No. 01-2135 (Case: 501.43127X00), and please credit any excess fees to such deposit account.

Respectfully submitted,

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